SECOND PRELIMINARY AMENDMENT
U.S. APPLICATION NO. 10/660,356
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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. - 82. (canceled)

83. (new) Apparatus for electrically testing electrical circuits, comprising:

at least one array of non-contact stimulator electrodes including a multiplicity of individually controlled stimulator electrodes arranged to be linearly disposed adjacent a first side of an electrical circuit to be tested;

a signal generator coupled to said at least one array arranged to supply an electrical stimulation signal to each of the stimulator electrodes; and

at least two non-contact sensor electrodes, each sensor electrode having dimensions sufficiently large to overlay part of a conductor on said electrical circuit to be tested.

84. (new) Apparatus as claimed in claim 83, wherein at least one of said at least two non-contact sensor electrodes is arranged to lie on a second side of said electrical circuit to be tested, opposite to said first side.

85. (new) Apparatus as claimed in claim 83, wherein said sensor electrodes are operative to correlate a signal to a particular non-contact stimulator electrode to provide spatial information .

86. (new) Apparatus as claimed in claim 83, wherein at least some of said electrical stimulation signals are at different frequencies.

87. (new) Apparatus as claimed in claim 83, wherein said electrical stimulation signals are multiplexed.

88. (new) Apparatus as claimed in claim 83, wherein said at least two non contact-sensor electrodes are arranged to lie adjacent said first side of said electrical circuit to be tested.

89. (new) Apparatus as claimed in claim 88, wherein said at least two non-contact sensor electrodes are arranged to lie on opposite sides of said at least one array of non-contact stimulator electrodes.

90. (new) Apparatus as claimed in claim 83, wherein said at least two non-contact sensor electrodes includes at least one sensor electrode arranged to lie adjacent a second side of said electrical circuit to be tested, said second side being opposite said first side.

91. (new) Apparatus as claimed in claim 83, further comprising:

a separating detector arranged to receive an output from each of said non-contact sensor electrodes and being operative to correlate a signal to a particular non-contact sensor electrode;

a signal analyzer operative to receive said outputs and to analyze the outputs;

a comparator operative to compare said outputs to an expected signal; and

a report generator at least reporting the presence of defects in said electrical circuit to be tested.

92. (new) Apparatus as claimed in claim 91, wherein said defects included defects selected from a group of defects including: faulty conductor continuity, shorts between conductors, and breaks in conductors.

93. (new) Apparatus as claimed in claim 83, wherein said non-contact stimulator electrodes are configured to generate localized electromagnetic fields each stimulating different conductors on said electrical circuit to be tested.

94. (new) Apparatus as claimed in claim 83, wherein said non-contact stimulator electrodes are arranged to be scanned over said electrical circuit to be tested.

95. (new) Apparatus claimed in claim 83, wherein said non-contact sensor electrodes are at least as large as said electrical circuit to be tested.

96. (new) A method for electrically testing electrical circuits, comprising:

stimulating conductors on an electrical circuit to be tested with a multiplicity of individually controlled stimulator electrodes linearly arranged adjacent a first side of said electrical circuit to be tested;

supplying an electrical stimulation signal to each of the stimulator electrodes; and

sensing a response to said stimulating with at least two non-contact sensor electrodes, each sensor having dimensions sufficiently large to overlay part of a conductor on said electrical circuit to be tested.

97. (new) The method as claimed in claim 96, further comprising correlating a signal to a particular non-contact stimulator electrode to provide spatial information.

98. (new) The method as claimed in claim 97, wherein said correlating comprises operating said stimulator electrodes at different frequencies.

99. (new) The method as claimed in claim 97, wherein said correlating comprises multiplexing said electrical stimulation signals.

100. (new) The method as claimed in claim 96, wherein sensing comprises sensing said response on said first side of said electrical circuit to be tested.

101. (new) The method as claimed in claim 100, wherein said sensing comprises sensing said response on opposite sides of said multiplicity of said non-contact stimulator electrodes.

102. (new) The method as claimed in claim 96, wherein sensing comprises sensing said response on a second side of said electrical circuit to be tested, said second side being opposite said first side.

103. (new) The method as claimed in claim 96, further comprising:
associating a signal with a particular non-contact sensor electrode;
analyzing outputs of said sensors;
comparing compare said outputs to an expected signal; and
reporting the presence of electrical defects in said electrical circuit to be tested.

104. (new) The method as claimed in claim 103, wherein said defects included defects selected from a group of defects including: faulty conductor continuity, shorts between conductors, and breaks in conductors.

105. (new) The method as claimed in claim 96, wherein stimulating comprises generating localized electromagnetic fields at each stimulator electrode, each localized electromagnetic field stimulating a different conductor on said electrical circuit to be tested.

106. (new) The method as claimed in claim 96, further comprising scanning said non-contact stimulator electrodes over said electrical circuit to be tested.

107. (new) The method claimed in claim 96, wherein said non-contact sensor electrodes are at least as large as said electrical circuit to be tested.